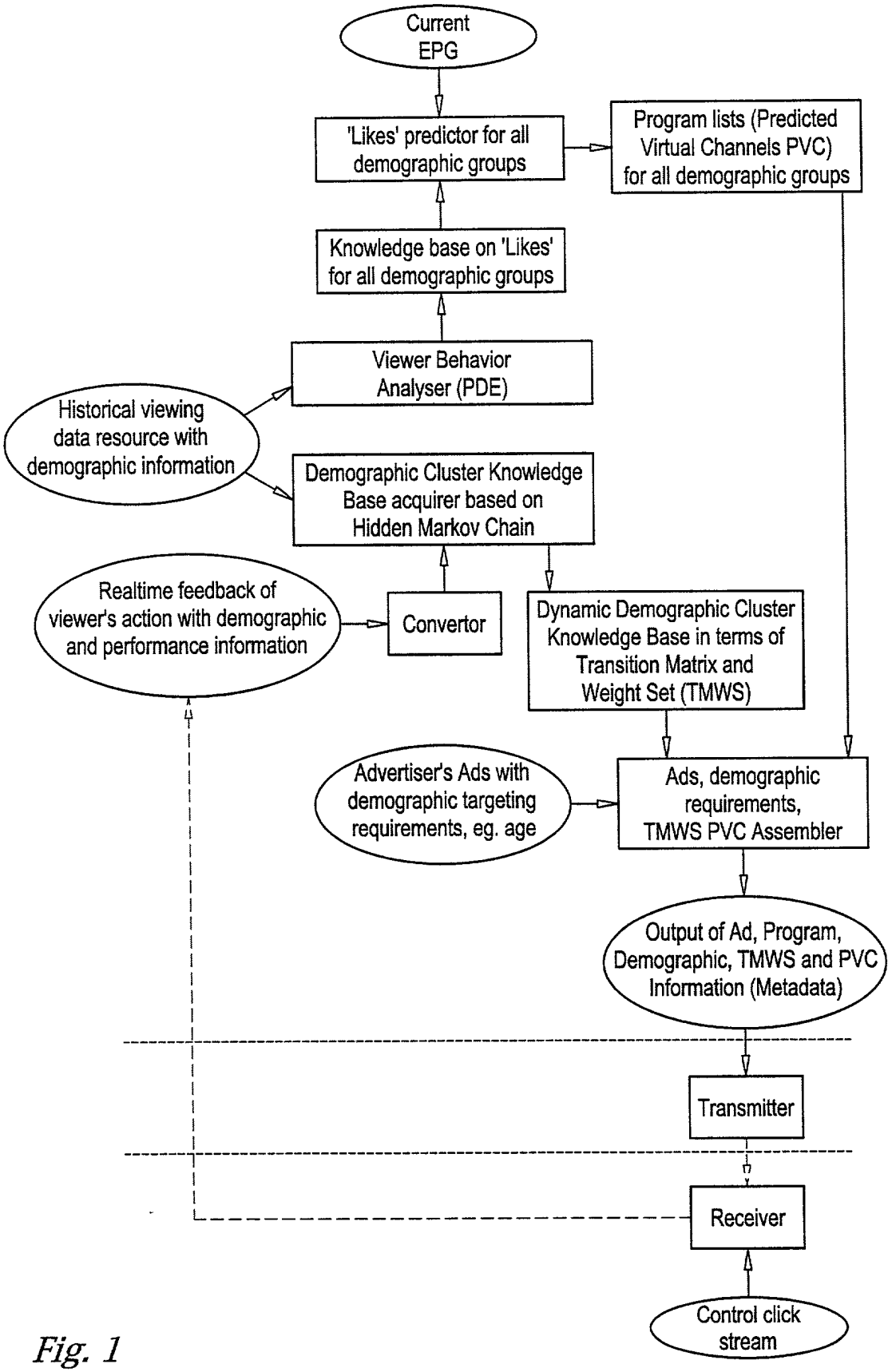

Current EPG
'Likes' predictor for all demographic groups
Program lists (Predicted Virtual Channels PVC) for all demographic groups
Knowledge base on 'Likes' for all demographic groups
Viewer Behavior Analyser (PDE)
Historical viewing data resource with demographic information
Demographic Cluster Knowledge Base acquirer based on Hidden Markov Chain
Realtime feedback of viewer's action with demographic and performance information
Convertor
Dynamic Demographic Cluster Knowledge Base in terms of Transition Matrix and Weight Set (TMWS)
Advertiser's Ads with demographic targeting requirements, eg. age
Ads, demographic requirements, TMWS PVC Assembler
Output of Ad, Program, Demographic, TMWS and PVC Information (Metadata)
Transmitter
Receiver
Control click stream

Fig. 1

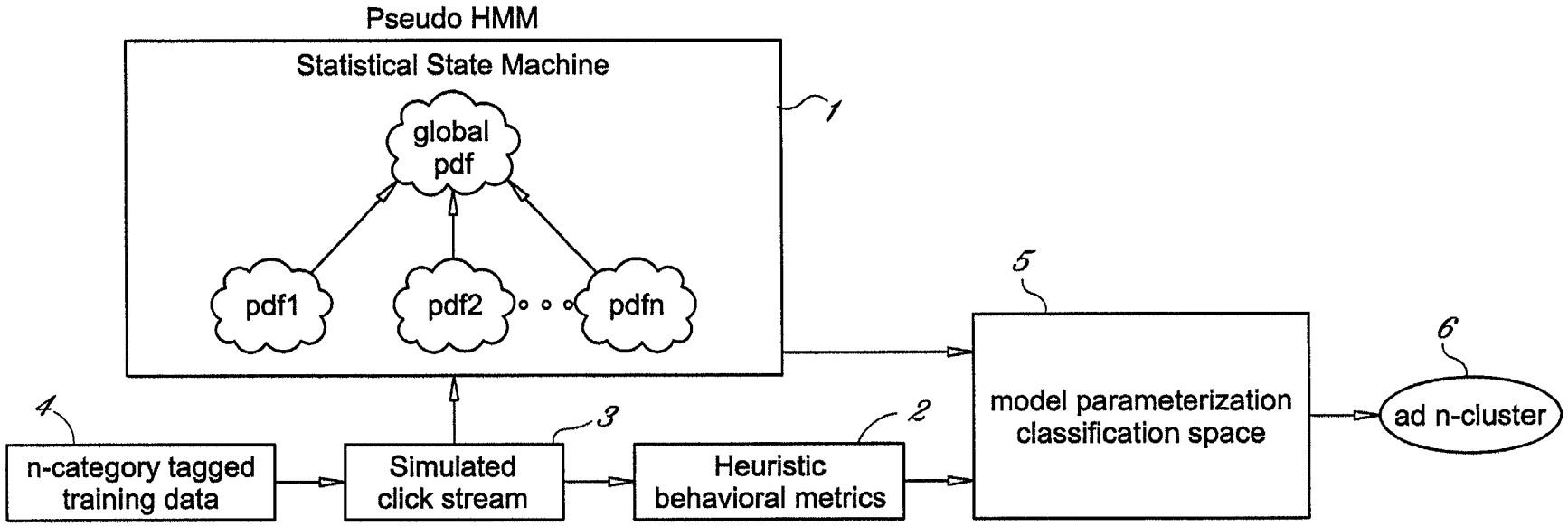

Pseudo HMM
Statistical State Machine
1
global pdf
pdf1
pdf2
pdfn
5
6
model parameterization classification space
ad n-cluster
4
n-category tagged training data
3
Simulated click stream
2
Heuristic behavioral metrics

Fig. 2

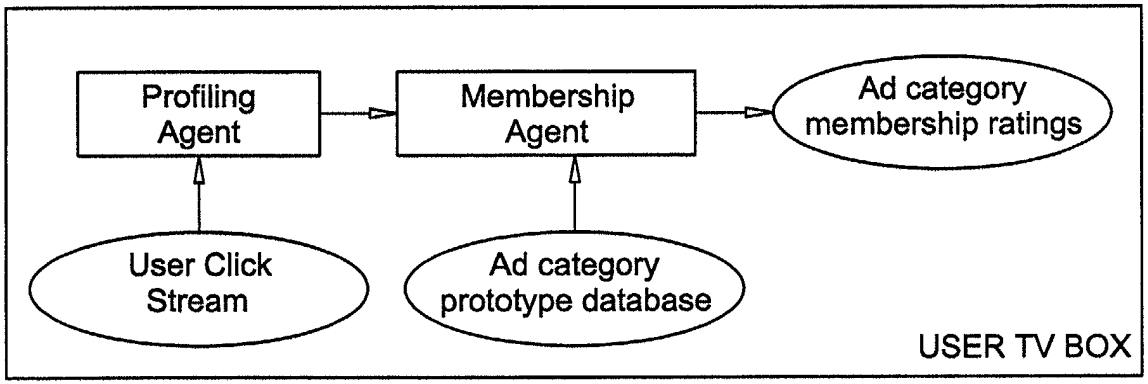

Profiling Agent
Membership Agent
Ad category membership ratings
User Click Stream
Ad category prototype database
USER TV BOX

Fig. 8

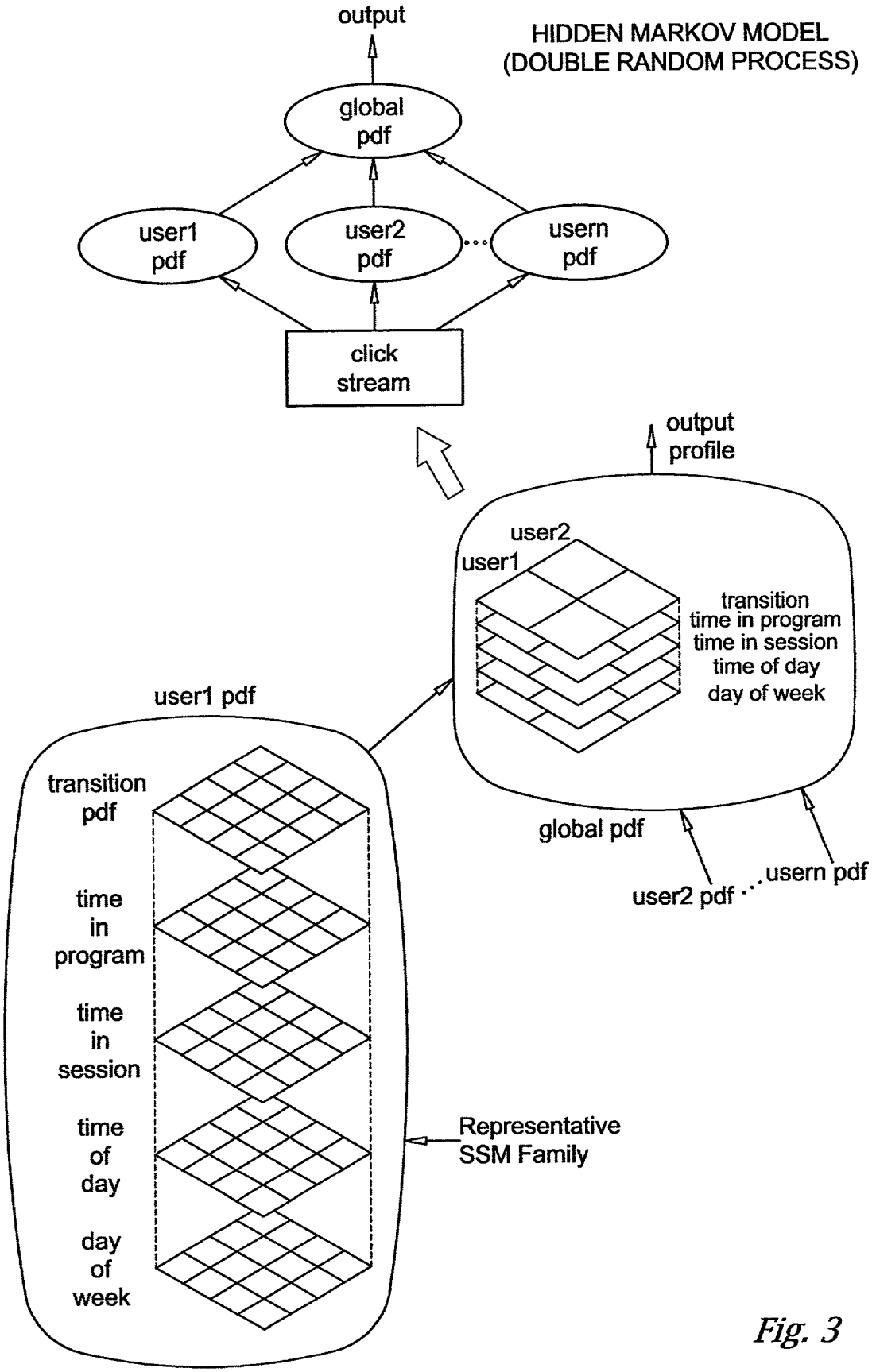

output
HIDDEN MARKOV MODEL
(DOUBLE RANDOM PROCESS)
global pdf
user1 pdf
user2 pdf
usern pdf
click stream
output profile
user2
user1
transition
time in program
time in session
time of day
day of week
user1 pdf
transition pdf
time in program
time in session
time of day
day of week
Representative SSM Family
global pdf
user2 pdf
usern pdf

Fig. 3

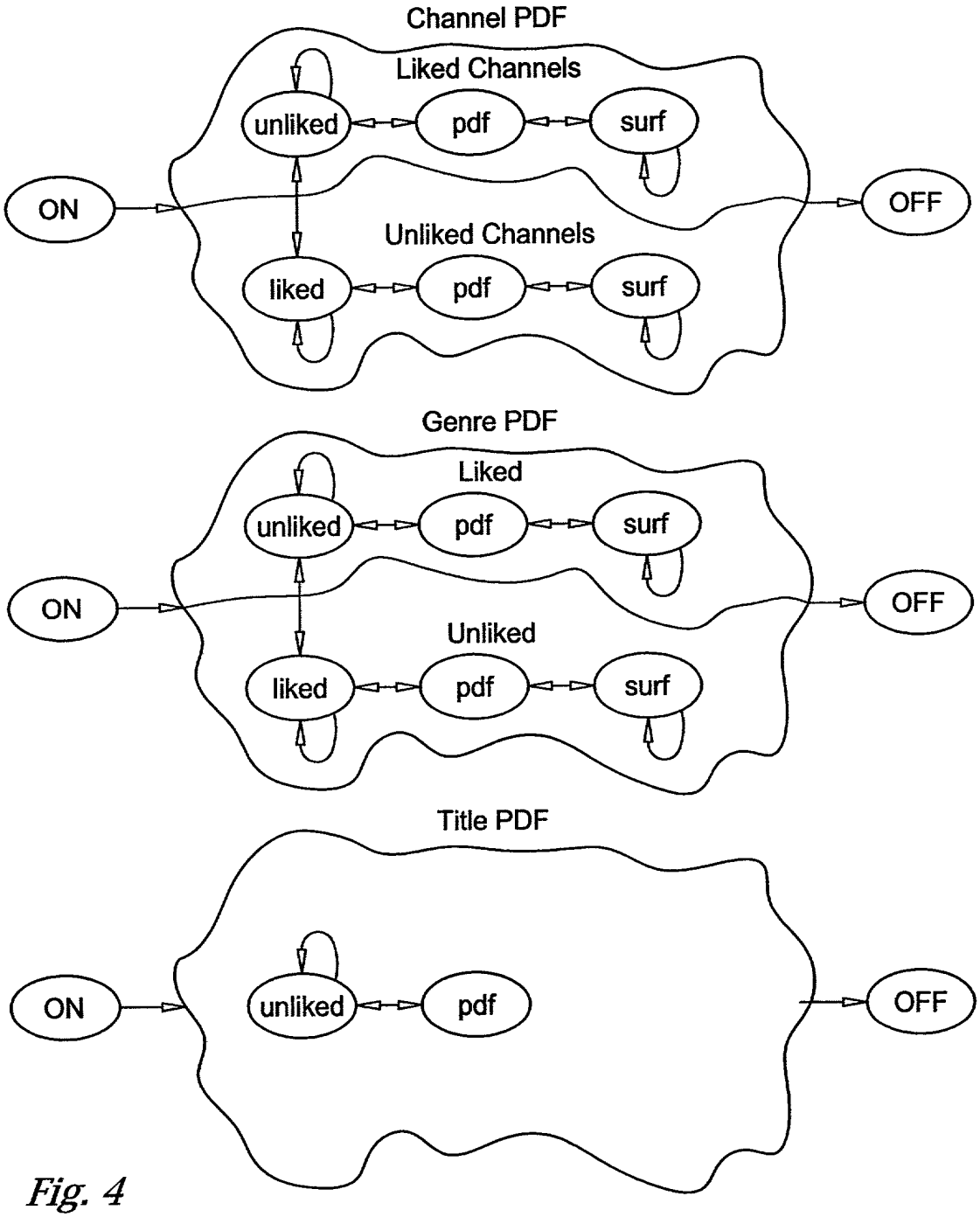

Channel PDF
Liked Channels
unliked
pdf
surf
ON
OFF
Unliked Channels
liked
pdf
surf
Genre PDF
Liked
unliked
pdf
surf
ON
OFF
Unliked
liked
pdf
surf
Title PDF
ON
unliked
pdf
OFF

Fig. 4

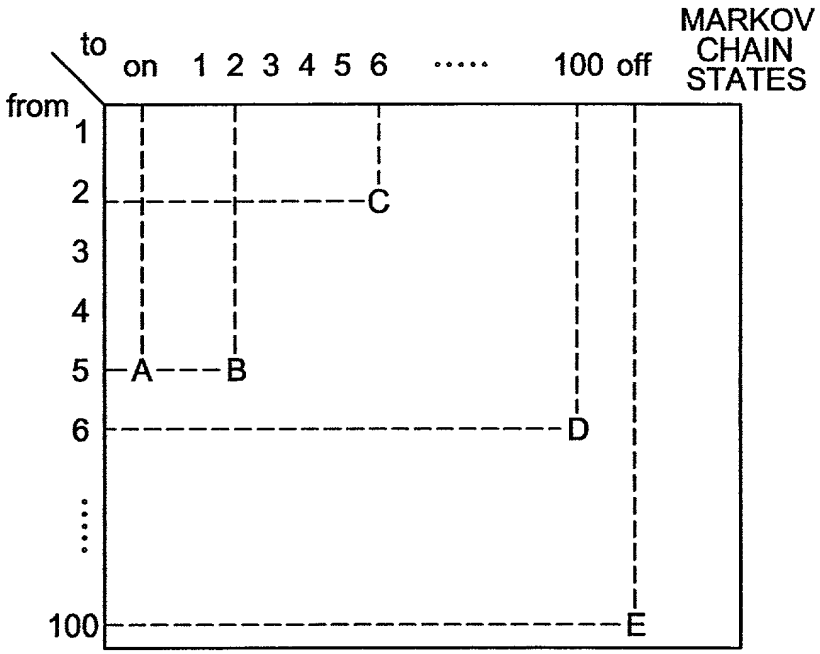

to
from
on
1
2
3
4
5
6
.....
100
off
MARKOV CHAIN STATES
1
2
3
4
5
6
100
A
B
C
D
E

Fig. 5

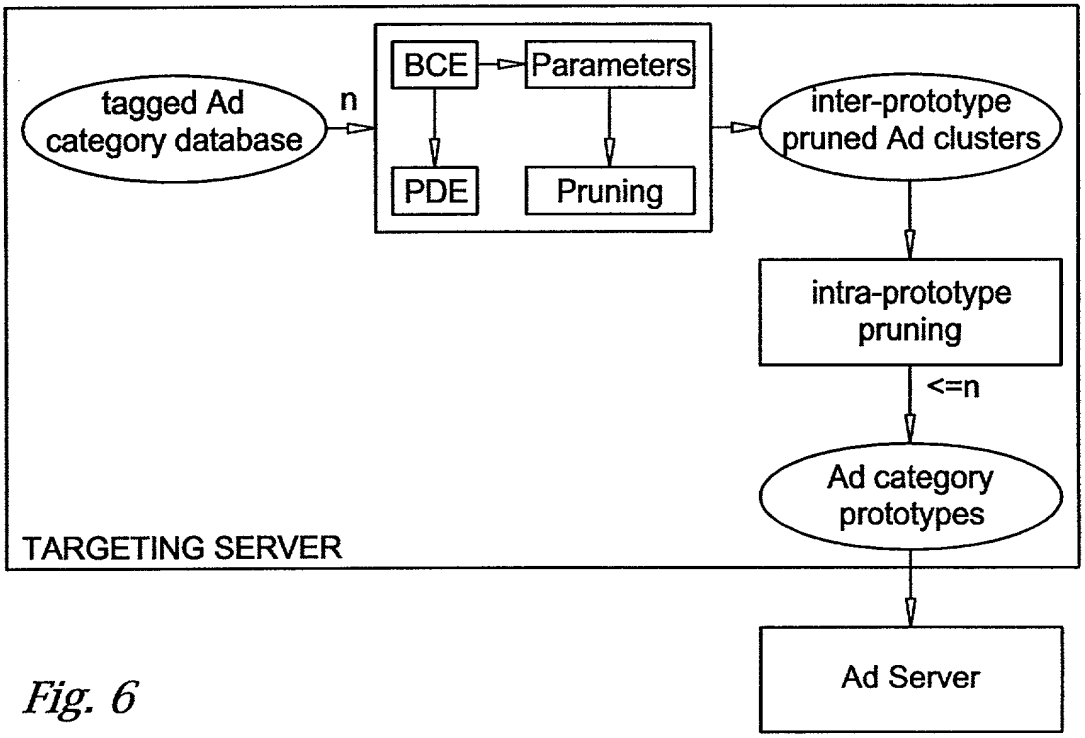

tagged Ad category database
n
BCE
Parameters
PDE
Pruning
inter-prototype pruned Ad clusters
intra-prototype pruning
<=n
Ad category prototypes
TARGETING SERVER
Ad Server

Fig. 6

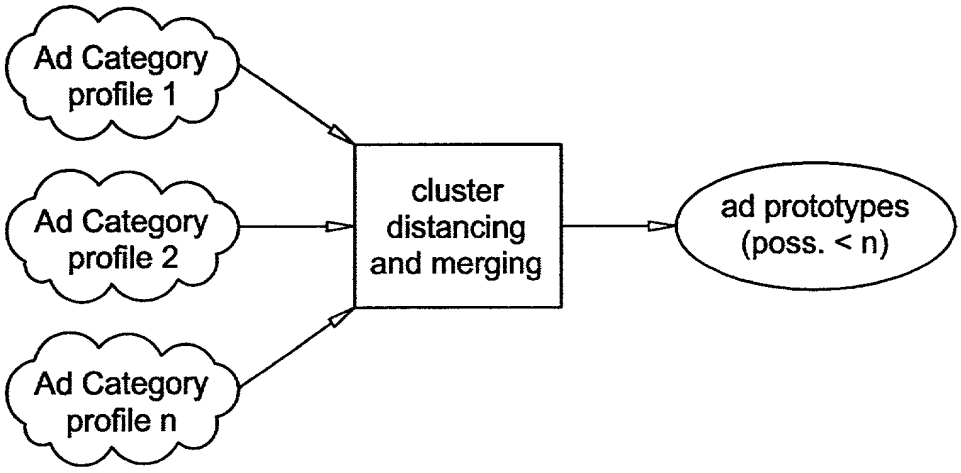

Ad Category profile 1
Ad Category profile 2
Ad Category profile n
cluster distancing and merging
ad prototypes (poss. < n)

Fig. 7

SUBSTITUTE SHEET

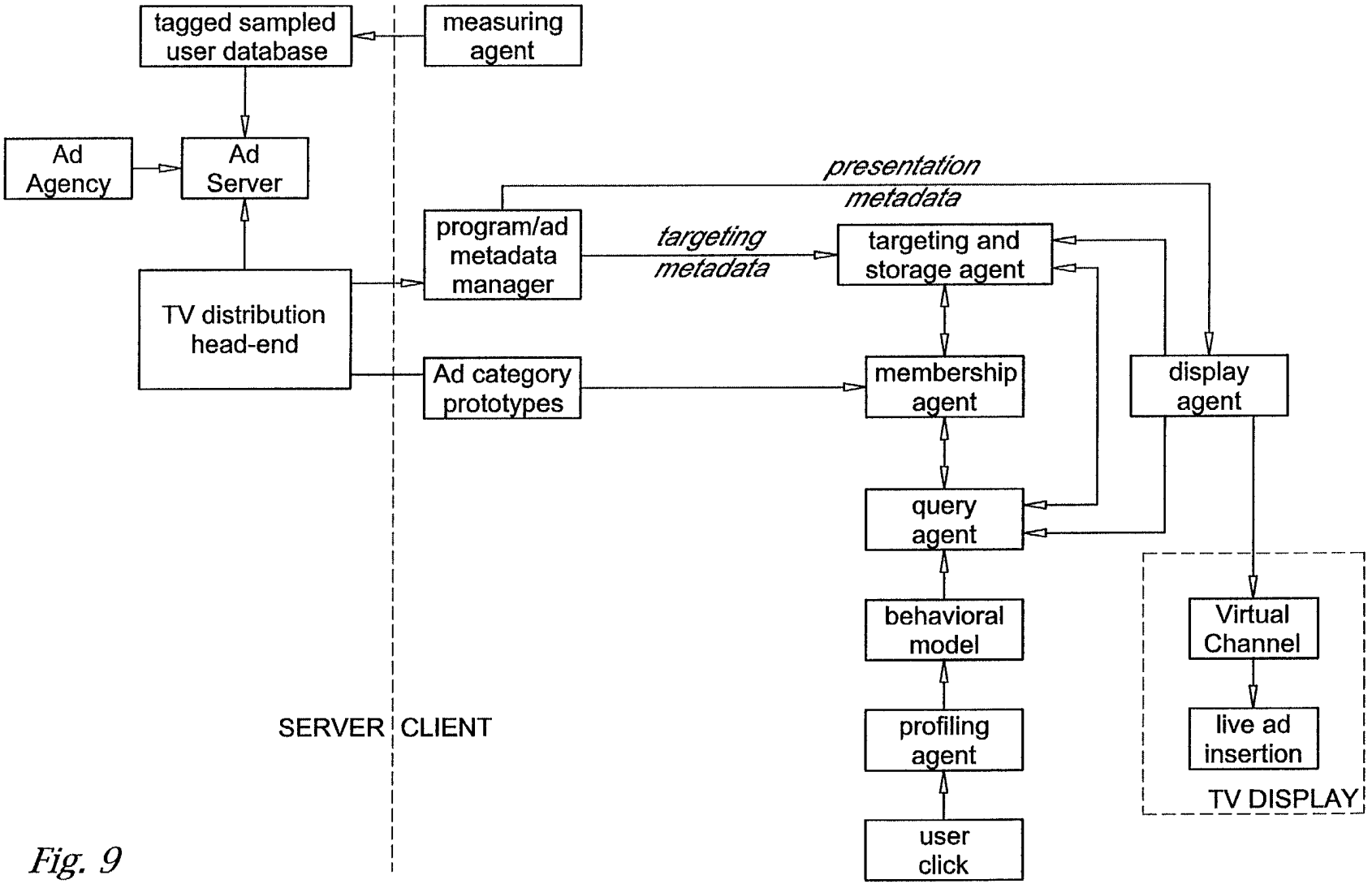


Fig. 9

Attorney Docket

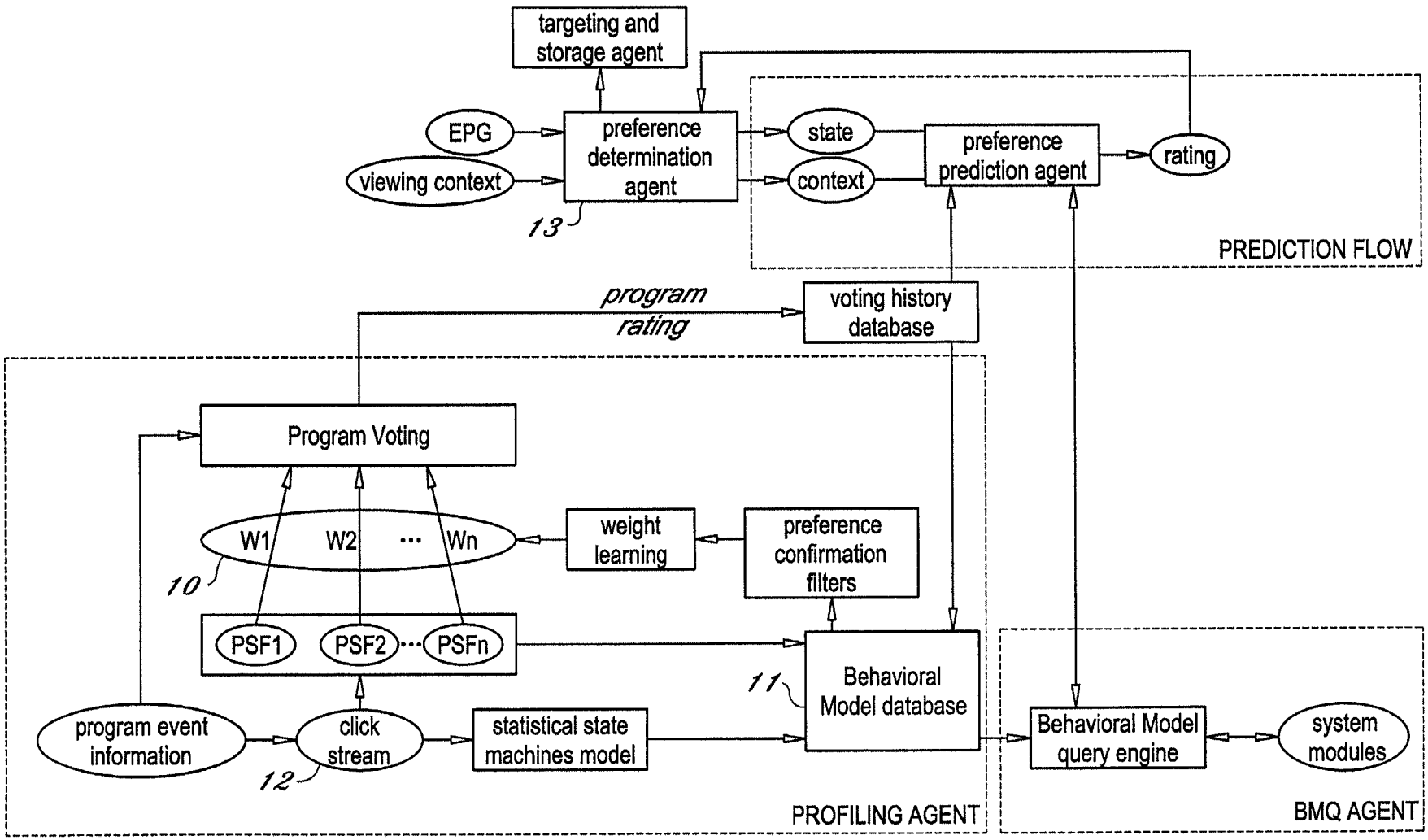


Fig. 10

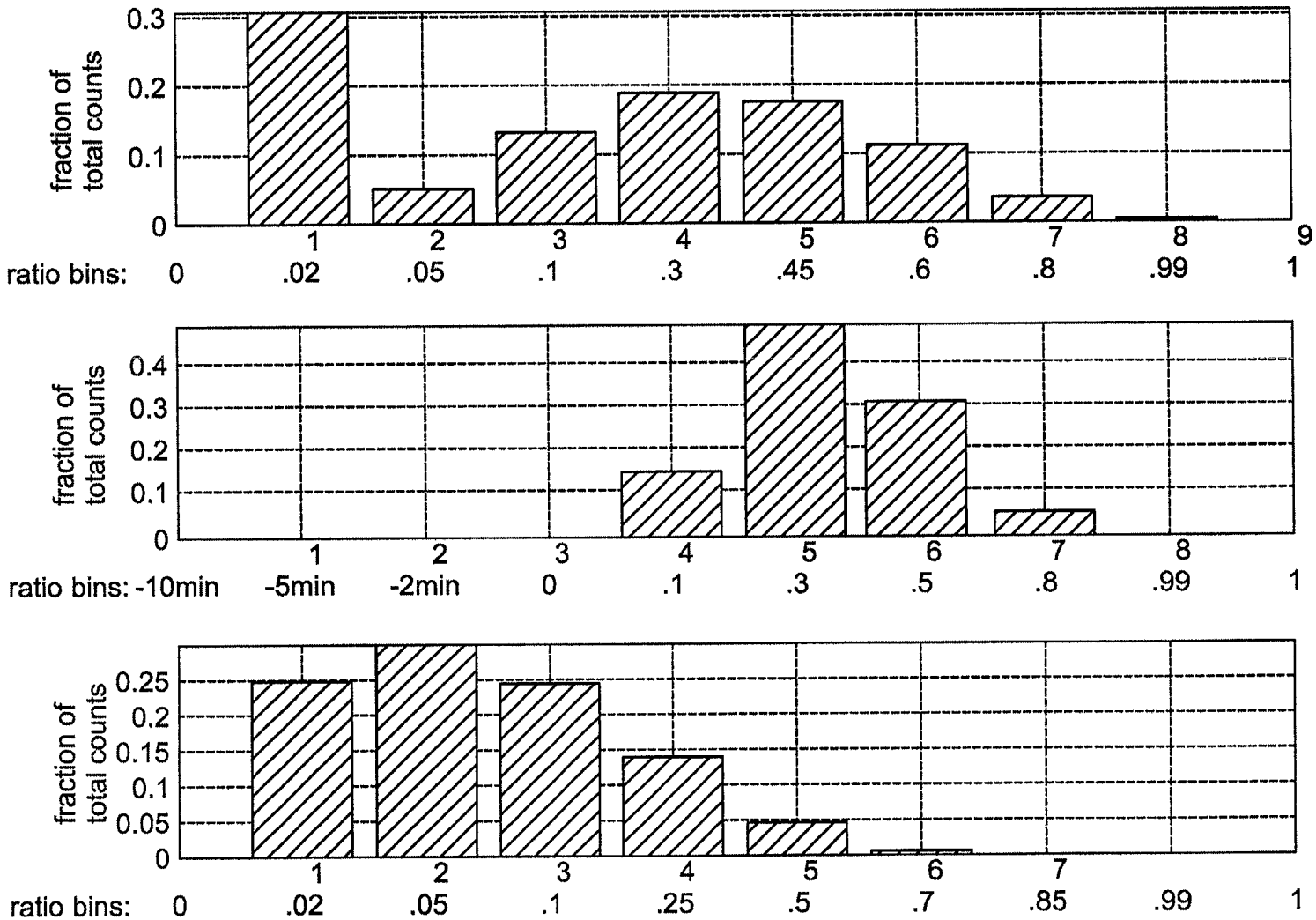

fraction of total counts
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9
ratio bins: 0 .02 .05 .1 .3 .45 .6 .8 .99 1
fraction of total counts
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8
ratio bins: -10min -5min -2min 0 .1 .3 .5 .8 .99 1
fraction of total counts
0.25
0.2
0.15
0.1
0.05
0
1 2 3 4 5 6 7
ratio bins: 0 .02 .05 .1 .25 .5 .7 .85 .99 1

Fig. 11

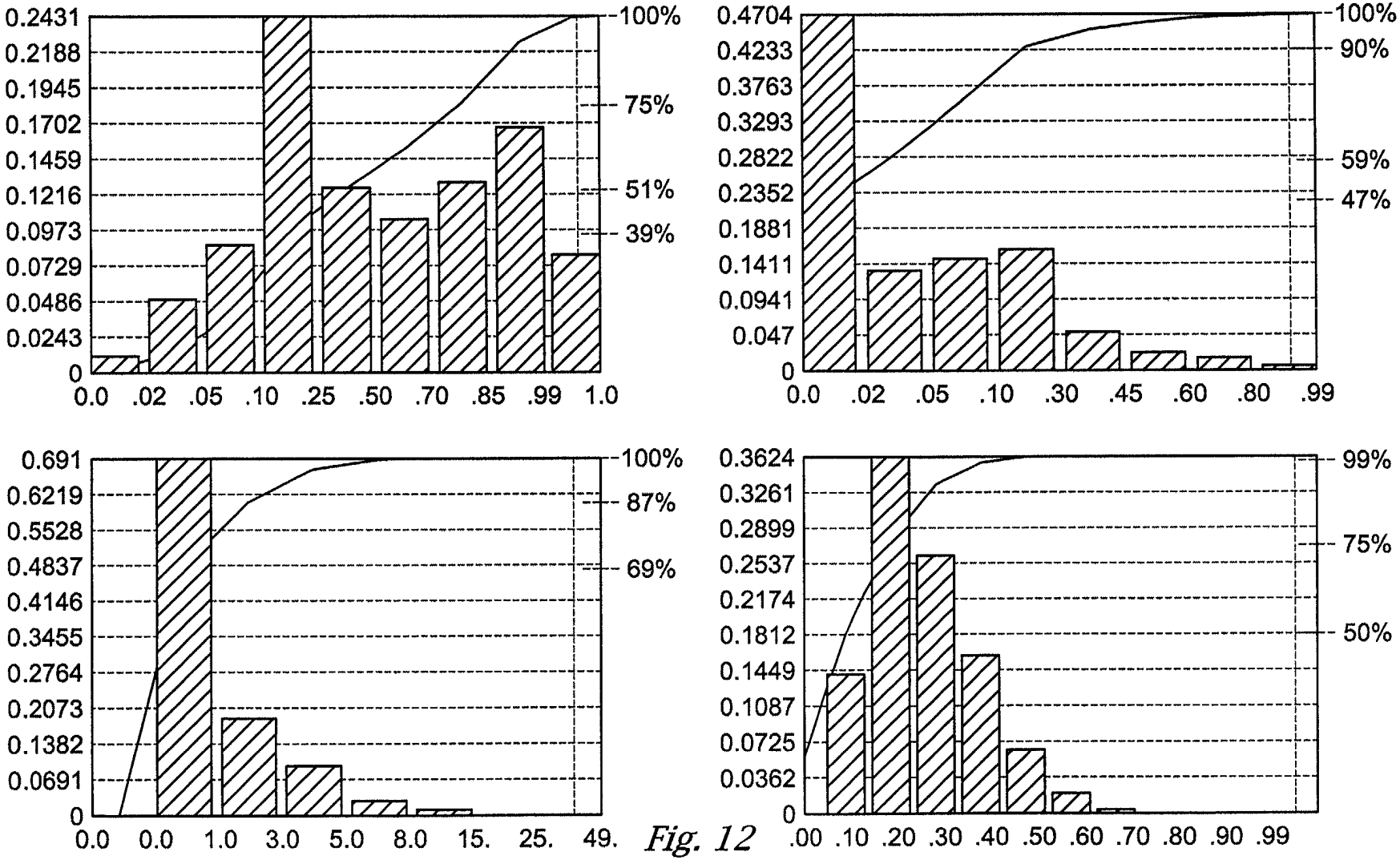
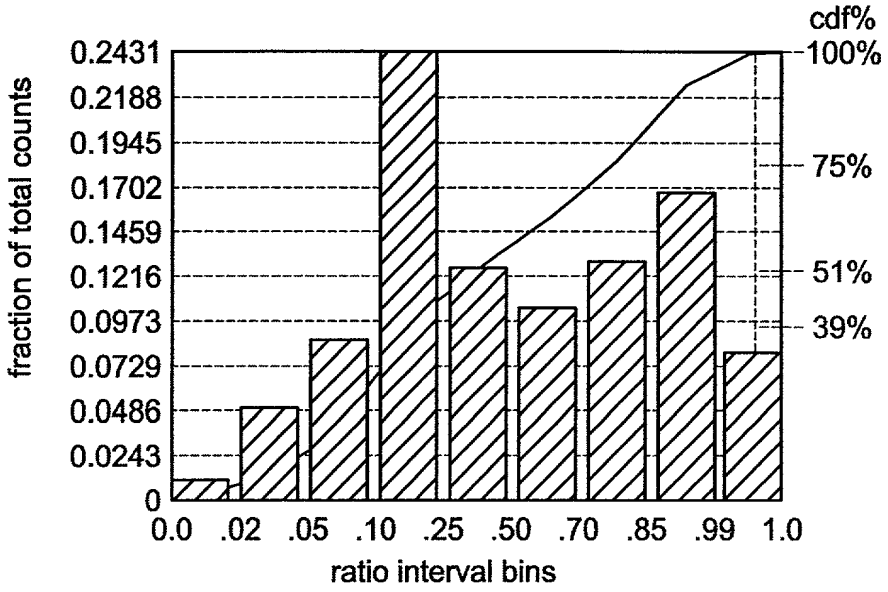

0.2431
0.2188
0.1945
0.1702
0.1459
0.1216
0.0973
0.0729
0.0486
0.0243
0
0.0 .02 .05 .10 .25 .50 .70 .85 .99 1.0
100%
75%
51%
39%
0.4704
0.4233
0.3763
0.3293
0.2822
0.2352
0.1881
0.1411
0.0941
0.047
0
0.0 .02 .05 .10 .30 .45 .60 .80 .99
100%
90%
59%
47%
0.691
0.6219
0.5528
0.4837
0.4146
0.3455
0.2764
0.2073
0.1382
0.0691
0
0.0 0.0 1.0 3.0 5.0 8.0 15. 25. 49.
100%
87%
69%
0.3624
0.3261
0.2899
0.2537
0.2174
0.1812
0.1449
0.1087
0.0725
0.0362
0
.00 .10 .20 .30 .40 .50 .60 .70 .80 .90 .99
99%
75%
50%

Fig. 12

1657 user, program hopping time-watched/time-available



1657 user, time hopped away before returning to program ratio:HopdT/time-avilable

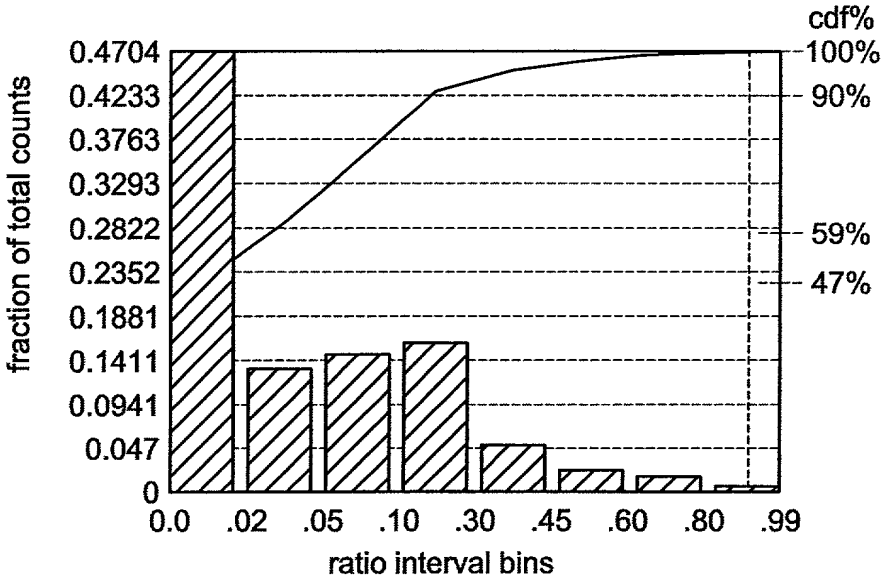
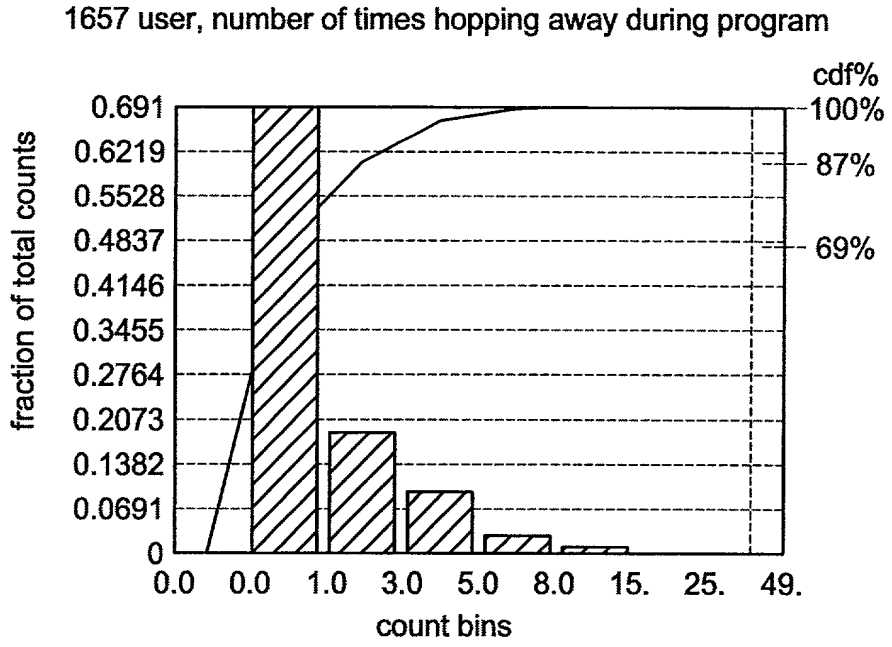


Fig. 12A


1657 user, number of times hopping away during program
cdf%
100%
87%
69%
fraction of total counts
0.691
0.6219
0.5528
0.4837
0.4146
0.3455
0.2764
0.2073
0.1382
0.0691
0
0.0 0.0 1.0 3.0 5.0 8.0 15. 25. 49.
count bins

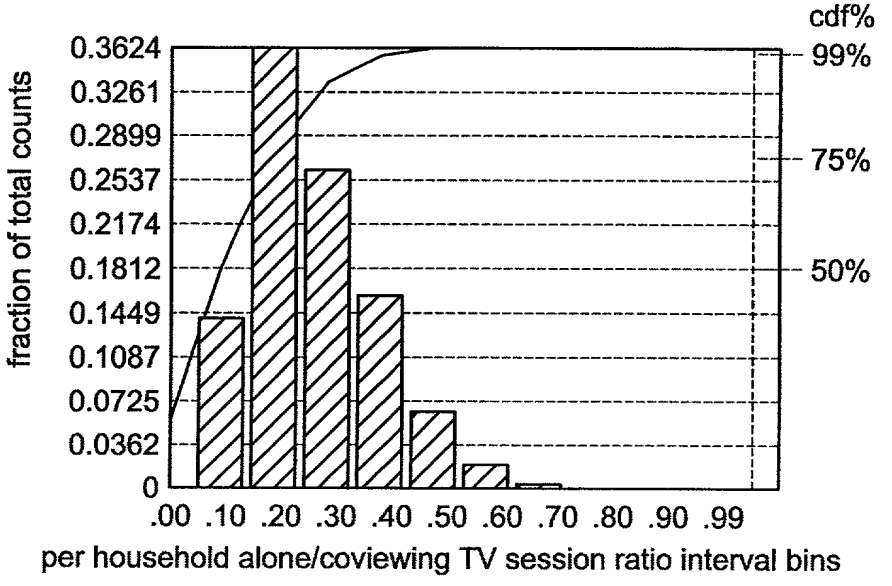

multi-viewer household alone/coviewing ratio
cdf%
99%
75%
50%
fraction of total counts
0.3624
0.3261
0.2899
0.2537
0.2174
0.1812
0.1449
0.1087
0.0725
0.0362
0
.00 .10 .20 .30 .40 .50 .60 .70 .80 .90 .99
per household alone/coviewing TV session ratio interval bins

Fig. 12B

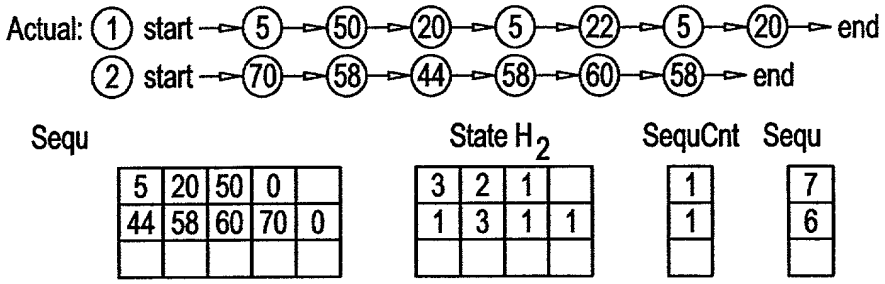


Fig. 13A

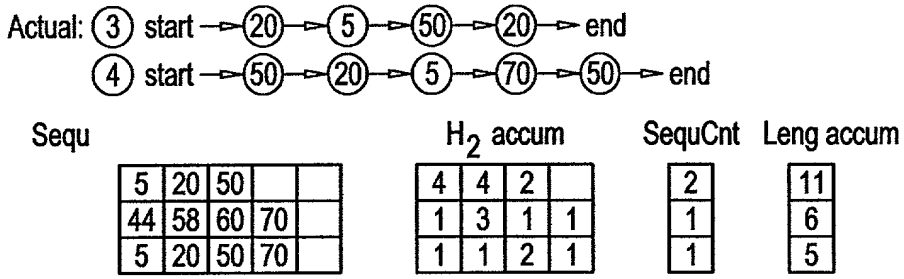


Fig. 13B

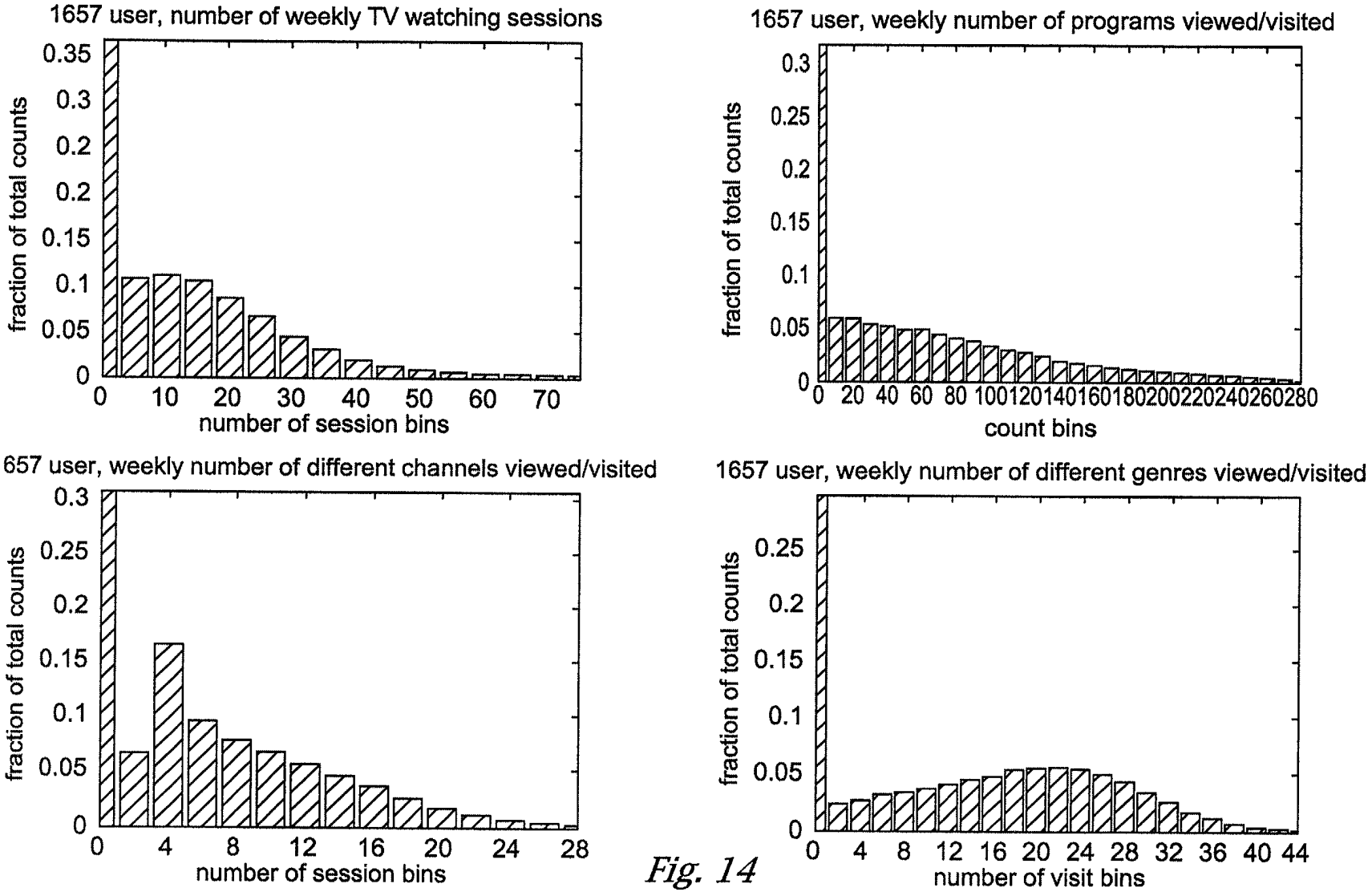
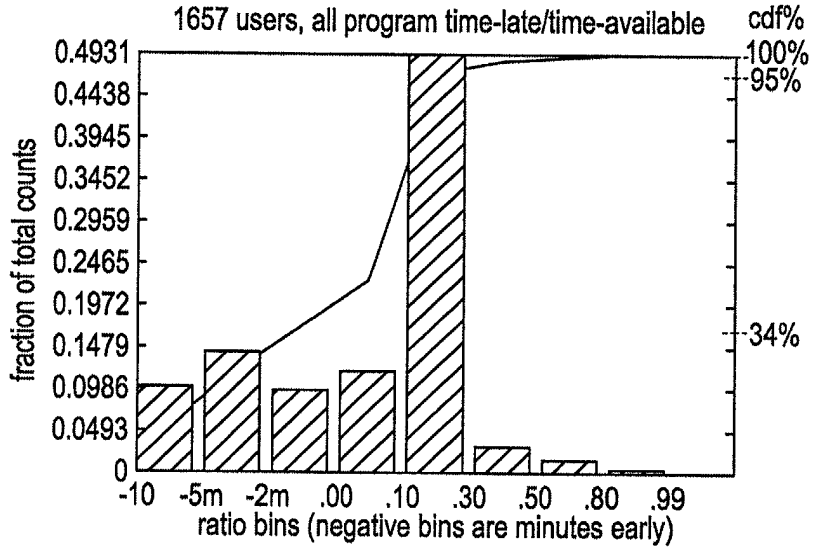
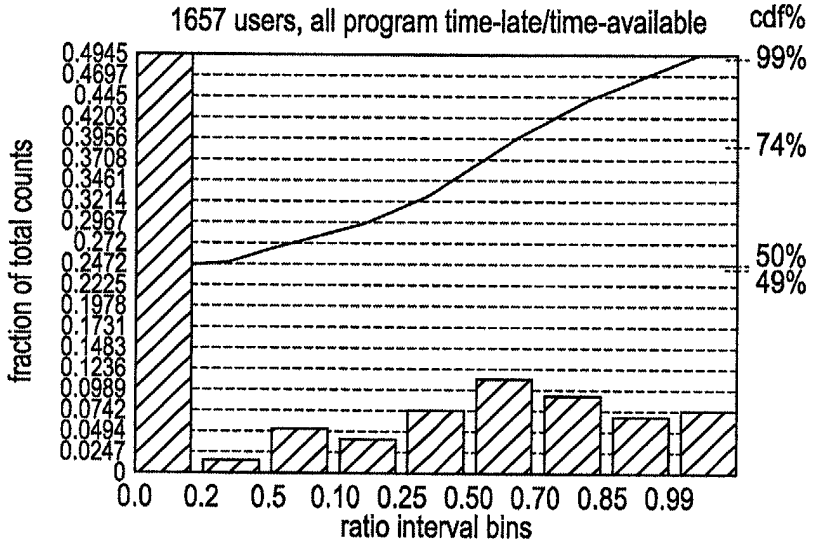
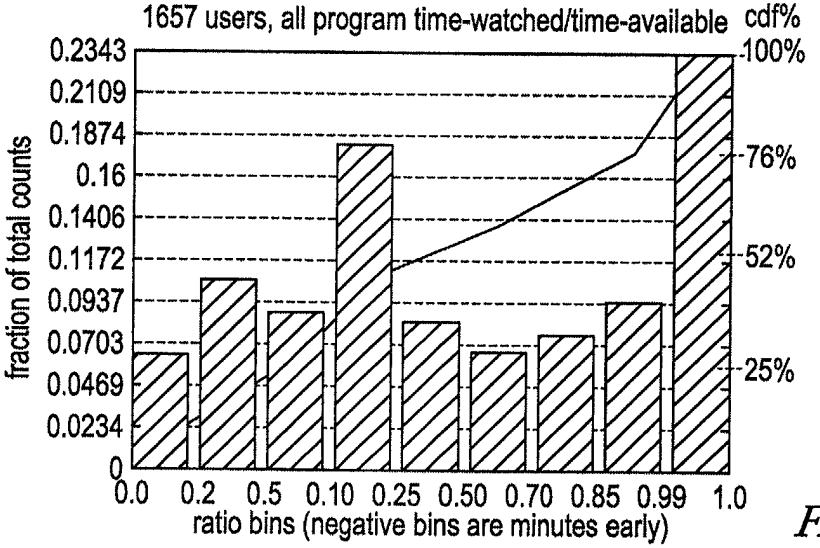

1657 user, number of weekly TV watching sessions
fraction of total counts
number of session bins
1657 user, weekly number of programs viewed/visited
fraction of total counts
count bins
1657 user, weekly number of different channels viewed/visited
fraction of total counts
number of session bins
1657 user, weekly number of different genres viewed/visited
fraction of total counts
number of visit bins

Fig. 14


1657 users, all program time-late/time-available
cdf%
100%
95%
34%
fraction of total counts
0.4931
0.4438
0.3945
0.3452
0.2959
0.2465
0.1972
0.1479
0.0986
0.0493
0
-10 -5m -2m .00 .10 .30 .50 .80 .99
ratio bins (negative bins are minutes early)


1657 users, all program time-late/time-available
cdf%
99%
74%
50%
49%
fraction of total counts
0.4945
0.4697
0.445
0.4203
0.3956
0.3708
0.3461
0.3214
0.2967
0.272
0.2472
0.2225
0.1978
0.1731
0.1483
0.1236
0.0989
0.0742
0.0494
0.0247
0
0.0 0.2 0.5 0.10 0.25 0.50 0.70 0.85 0.99
ratio interval bins


1657 users, all program time-watched/time-available
cdf%
100%
76%
52%
25%
fraction of total counts
0.2343
0.2109
0.1874
0.16
0.1406
0.1172
0.0937
0.0703
0.0469
0.0234
0
0.0 0.2 0.5 0.10 0.25 0.50 0.70 0.85 0.99 1.0
ratio bins (negative bins are minutes early)

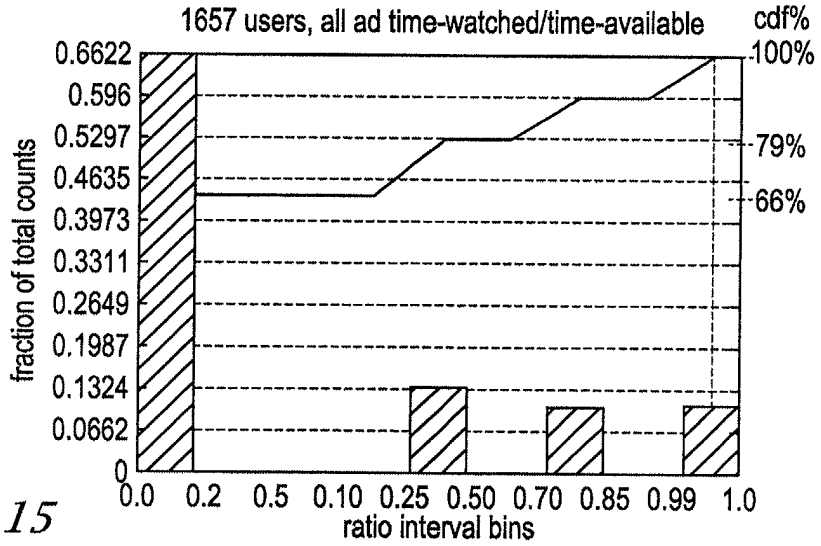

1657 users, all ad time-watched/time-available
cdf%
100%
79%
66%
fraction of total counts
0.6622
0.596
0.5297
0.4635
0.3973
0.3311
0.2649
0.1987
0.1324
0.0662
0
0.0 0.2 0.5 0.10 0.25 0.50 0.70 0.85 0.99 1.0
ratio interval bins

Fig. 15